

**Work Order ID 61769**

Thursday, September 02, 2010 11:28:27 AM

Page 1

Item ID: D350-748-201

Accept

Revision ID:

Item Name: Crosstube Installation, High Aft

Start Date: 9/2/2010 Start Qty: 1.00

Required Date: 9/20/2010 Req'd Qty: 1.00

Reference:

Approvals:

Process Plan:

Date: 10-9-07

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run

Start

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

Draw Nbr

Revision Nbr

D350-748-241

Rev E

100



DC

Document Control

DOCUMENT CONTROL

0.00

Memo

0.00

Photocopy bluefile &amp; type labels per PPPD350-748-201

CHG001

8/10/07

DP 10-12-7  
10-02-03

110



CNC Bend 2

CNC Alpha 160 Bender

BENDING MACHINE - CROSSTUBES

0.00

Memo

0.00

Bend tube as per Dwg D350-748-241 using CNC bender program D350A and Folio FT

DP 10-12-7

120



QC

Quality Control

QC15- Crosstube Dimensional Check

0.00

Memo

0.00

8/10/07

10

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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**NOTE:** Date & initial all entries

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QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
125 	HandFXtube	0.00				①			
Hand Finishing Crosstubes	Memo ***Stress relief*** Heat treat crosstube as per QSI010 4.3	0.00							
127 	QC5- Inspect part completeness to step on W/O	0.00							
QC	Memo	0.00							
Quality Control									

Start time 2h00  
End time 6h00  
SAD 10-12-08

8/10/12/08

RE MAXIM DEC DECNO  
PAZ SHAF.

W/O:		WORK ORDER CHANGES					
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Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130 	Crosstubes	0.00				①			
Crosstubes	Memo	0.00							
Crosstubes	1-Drill Tube as per Dwg D350-748-241 Using DT8876 Drill Jigs, Set-up drill table as per QSI 010								
	2-Deburr								
	3-Engrave Part # and Batch # as per Dwg D350-748-241								
	4-Remove all marks from tube within limits of D350-748-241								
	5- Apply a light coat of LPS3 on the interior of tube Batch: 109956								
140 	QC6- Inspect dimensions to drawing	0.00							
QC	Memo	0.00							
Quality Control									

SAD 10-12-13

SAD 10-12-22

8/10/12/22

10/12/21

140.5

DEFLECT GEAR

R10:13181

C210/12/21 ①

10/12/21 ①

issue R10 acumen for NDT

rec'd + inspect attached report NDT to W10;

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Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

150

Outsource process-Cadplate per QSI017 4.1.9.1

0.00



Outsource3

Memo

0.00

Outsource process - Cad plate

Issue P/O: 13189

Stress relief at 375° for 5 hours

Magnetic Particle Inspect per ASTM E1444

Cadium Plate per AMS-QQ-P-416B, Class 1, Type 2

Embrittle relief at 375° for 8 hours, Chromate Treat

Possible Supplier: Southwest United Industries

Ensure Certificate of Conformity is attached

CZ 10/12/22 ①

160

Receive &amp; Inspect for Damage &amp; Mat'l Certs

0.00



Packaging

Memo

0.00

Packaging

Ensure certificate of conformity is attached

Per 10/18 ④

170

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Quality Control

S 10/12/24 /GP 11.01.24twist = .097"SPM = 91.700" issue P/O per ASTM 1417 level 2 as per QSI 038P/O: 13367. CZ 11/01/26 ①Need inspect attached c/c to W/O10/04/24

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QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180  SprayPaint Spray Painting	SprayPaint  Memo 1-Prime inside crosstube as per QSI 005 4.2 2-Paint Outside of Tube as per Dart QSI 005 4.2	0.00  0.00					11	01	31 (1)
190  QC Quality Control	QC14- Inspect Spray Paint  Memo Then, Wrap in plastic bag to protect from scratches	0.00  0.00					11	02	02
200  Crosstubes Crosstubes	Crosstubes  Memo 1-Install Ground wire Insert, then insert screw and washer 2-Install Abraison strips as per Dwg D350-748-241 & QSI 035. 3-Install supports Using Dt8876 as per Dwg D350-748-241, Torque to 60-80 IN- LBS	0.00  0.00					11	02	02 (1)

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Run Start

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

210

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Quality Control

8/11/02/02

20

220

Pick Kit

0.00



Packaging

Memo

0.00

Packaging

11/2/30

230

QC4- 100% Inspect kits for completeness

0.00



QC

Memo

0.00

Quality Control

8/11/02/02

20

W/O:		WORK ORDER CHANGES					
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Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

240

0.00



Packaging

Packaging

Memo

0.00

Identify and pack for shipping as per PPPD350-748-201

Location: 102PPP Rev: A

250

0.00



QC21- Final Inspection - Work Order Release

QC

Memo

Quality Control

11/02/04

MF

11-02-03

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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# Picklist Print

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Page 1

Work Order ID: 61769

Parent Item: D350-748-201

Parent Item Name: Crosstube Installation, High Aft




Start Date: 9/2/2010

Required Date: 9/20/2010

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev: A New Issue 06-07-05 JLM  
 IPP Rev: B Update qty of MS21042L5 06-09-12 KJ  
 IPP Rev C Combined manufacturing 08.04.02 EC verified by: DD  
 IPP Rev:D 08-06-24 revD as per dwg DD verified by:EC  
 IPP Rev: E 08.12.11 Step17 was step 21 KJ Verified by:EC IPP Rev:F  
 10.08.04 added QSI010 4.3 DD verf:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D350-748-241TRN 		Manufactured	No			110	Each	3.0000	1	1			
Crosstube Turning Detail													
				<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>					
				LG	B61315	3							
					59549	1							
					59551	1							
					59587	1							
ALS4-1032-225 		Purchased	No			200	Each	5,336.000	1	1			
Insert													
				<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>					
				PK011		5336							
					110768	5336							
AN960JD10 	NAS1149D0363J	Purchased	No			200	Each	6.0000	1	1			
Washer													
				<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>					
				ST		6							
					107715	6							

13# 116025

DP 10-12-7

MA 11.02.02

MA 11.02.02

W/O:		WORK ORDER CHANGES					
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Start Date: 9/2/2010

Required Date: 9/20/2010

Start Qty: 1.00

Required Qty: 1.00

D2856-400 Manufactured No 200 f 313.4060 1.181 1.243158  
Abraison Strip

B# 63735

Location

Loc Qty

Loc Code

ST403

313.4060421

56626

97.4060421

59920

216

1- cut as per dwg D2856

D3502-1 Manufactured No 200 Each 54.0000 2 2  
Support

Location

Loc Qty

Loc Code

ST063

12

61206

12

ST066

42

50287

38

52903

4

MS21920-20 Purchased No 200 Each 77.0000 2 2  
Clamp (per MIL-DTL-8783C)

Location

Loc Qty

Loc Code

LG

77

112624

6

114687

21

114779

24

115057

26

B# 115736

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Shop Packet Print

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Required Date: 9/20/2010

Start Qty: 1.00

Required Qty: 1.00

MS27039-1-10

Purchased

No

200

Each

126.0000

1

1



Screw



ml 11.02.02

Location

Loc Qty

Loc Code

ST291

126

112794

26

112940

100

AN4-41A

Purchased

No

220

Each

274.0000

8

8



Bolt



11/2/3sf

Location

Loc Qty

Loc Code

ST337

40

ST360

234

111424

4

113359

30

114941

100

115108

100

AN4-6A

Purchased

No

220

Each

1,418.000

16

16



Bolt



11/2/3sf

Location

Loc Qty

Loc Code

ST356

1418

112933

96

113149

19

114523

2

114615

1

114941

500

115108

300

115457

500

16

W/O:		WORK ORDER CHANGES					
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Required Date: 9/20/2010

Start Qty: 1.00

Required Qty: 1.00

AN5-32A

Purchased

No

220

Each

196.0000

4

4



Bolt



M115698 11/2/13

Location

Loc Qty

Loc Code

ST340

196

113121

4

114056

42

114405

50

115016

50

115108

50

AN960JD416

NAS1149D0463J

Purchased

No

220

Each

0.0000

32

32



Washer



M116304 11/2/13

AN960JD516

NAS1149D0563J

Purchased

No

220

Each

34.0000

8

8



Washer



M114742 11/2/13

Location

Loc Qty

Loc Code

ST

34

103694

18

107534

12

109287

4

D3500-1

Manufactured

No

220

Each

30.0000

4

4



Saddle



B63995 11/2/13

Location

Loc Qty

Loc Code

ST424

30

55605

2

59422

16

60489

12

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Start Date: 9/2/2010

Required Date: 9/20/2010

Start Qty: 1.00

Required Qty: 1.00

D3501-1

Manufactured No

220

Each

394.0000

16

16



Bushing



11/2/350

## Location

## Loc Qty

## Loc Code

ST066

394

45402

15

45918

112

48268

67

53779

100

61196

100

Purchased

No

220

Each

2,363.000

24

24

MS21042L4



Nut



11/6/548

11/2/350

## Location

## Loc Qty

## Loc Code

ST300

2363

113422

68

114523

28

114718

16

114784

331

115108

1920

Purchased

No

220

Each

633.0000

4

MS21042L5



Nut



11/2/3

SD missou

## Location

## Loc Qty

## Loc Code

ST139

133

114813

133

ST300

500

115156

500

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Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

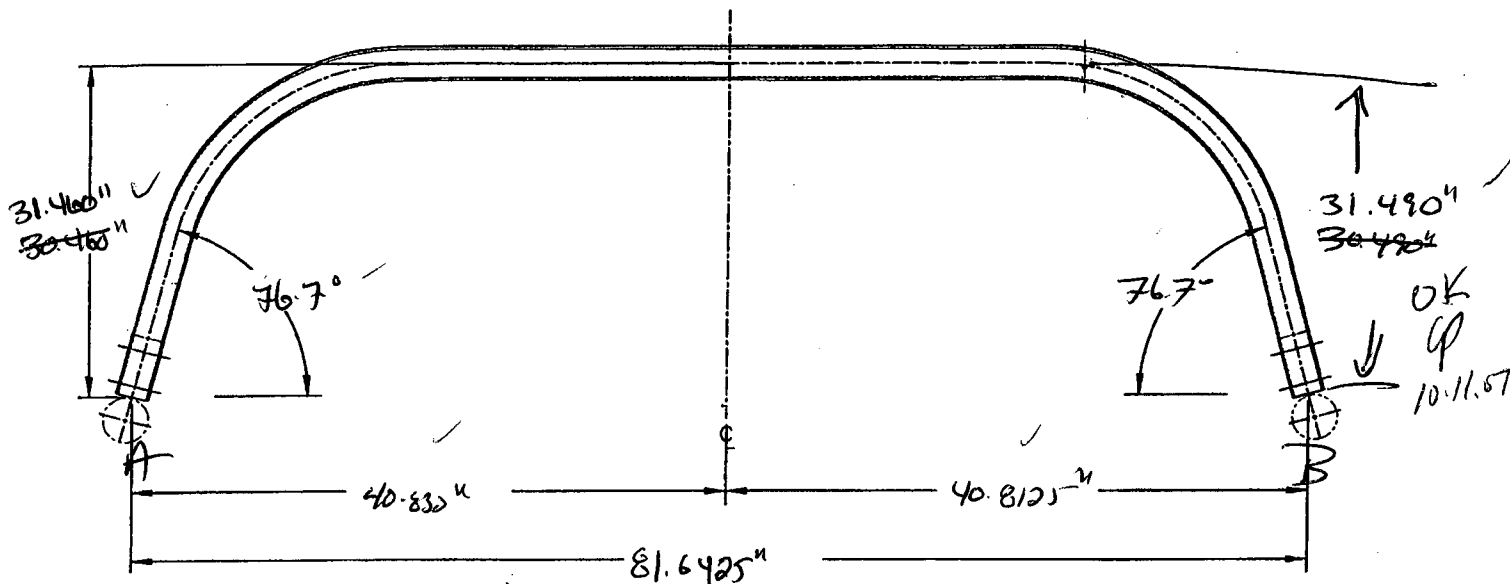
NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



DART AEROSPACE LTD		Work Order:	41719
Description: Crosstube High Aft (AS350/355)		Part Number:	D350-748-201
Inspection Dwg: D350-748-241 Rev: E		Page 1 of 1	

Required Dimension	Min	Max
Height	31.22	31.48
1/2 Span	40.77	41.03
Angle	75	77
Total Span	81.54	82.06



Comments
twist = 0.177" OK CP 10/11/07

QC15 Inspection	8
Date	10/12/07

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	10.08.23	Dwg Rev updated	KJ	

40.830  
40.8125  
81.6425

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

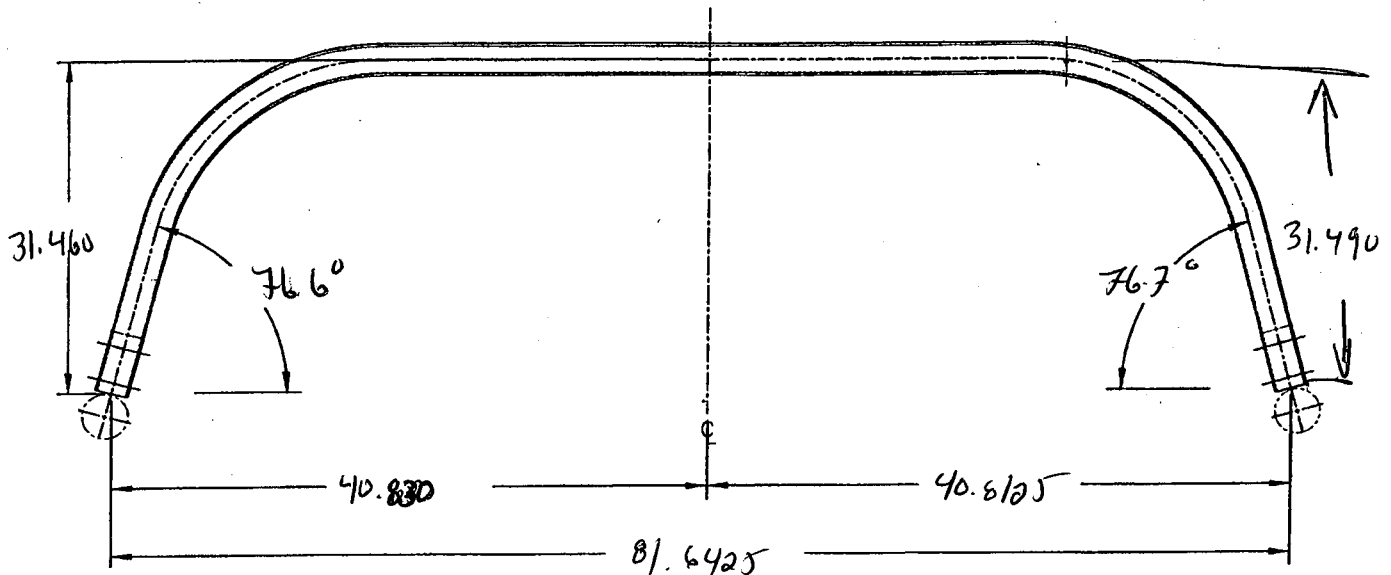
Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order:	
Description: Crosstube High Aft (AS350/355)		Part Number:	D350-748-201
Inspection Dwg: D350-748-241 Rev: E		Page 1 of 1	

Required Dimension	Min	Max
Height	31.22	31.48
1/2 Span	40.77	41.03
Angle	75	77
Total Span	81.54	82.06



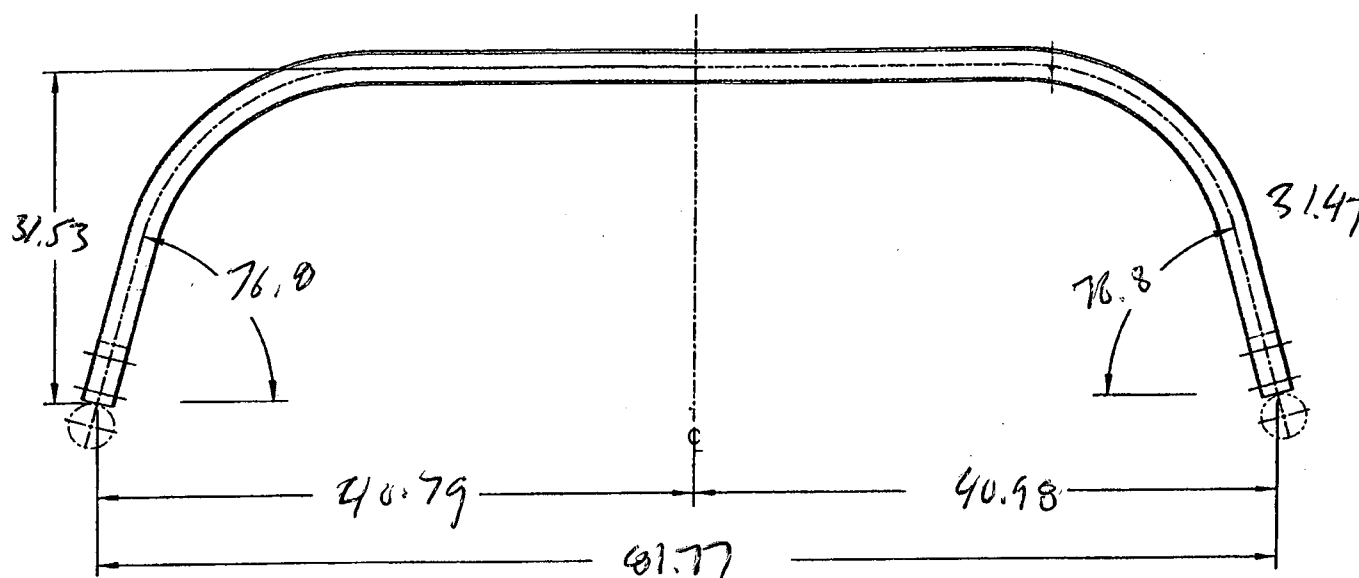
After stress relief	
Comments	
twist = 0.170"	

QC15 Inspection	S
Date	10/12/06

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	10.08.23	Dwg Rev updated	KJ	

<b>DART AEROSPACE LTD</b>	<b>Work Order:</b>	
<b>Description:</b> Crosstube High Aft (AS350/355)	<b>Part Number:</b>	<b>D350-748-201</b>
<b>Inspection Dwg:</b> D350-748-241 <b>Rev:</b> E		<b>Page 1 of 1</b>

Required Dimension	Min	Max
Height	31.22	31.48
1/2 Span	40.77	41.03
Angle	75	77
Total Span	81.54	82.06



Comments
AFTER DEFLECTION TEST

QC15 Inspection	CP
Date	10.12.22

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	10.08.23	Dwg Rev updated	KJ	

Item	Qty -241	Part Number	Description
1	X	D350-748-241	CROSSTUBE ASSEMBLY (AS 350/355 HI AFT)
2	1	D6018-125	CROSSTUBE
3	2	D3502-1	SUPPORT
4	2	D2856-400-710	ABRASION STRIP
5	1	AELS-1032-225	INSERT
6	1	NAS1149D0363J	WASHER (OR AN960JD10)
7	2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
8	1	MS27039-1-10	SCREW

#### GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6018-125  
FINISHED LENGTH = 122.700±0.06
- 2) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2  
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D350-748-241" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 29.85 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.297 HOLE.
- 9) RUN CUTTER OFF PART WHERE INDICATED. BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING.
- 12) INSTALL D2856-400-710 ABRASION STRIPS WITH A GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 13) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
- 14) TORQUE CLAMPS 60 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER  
W10-61769  
P10-908

RELEASED  
2009-10-29

E	REVISE GENERAL NOTES; UPDATE TO CURRENT STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A8-3); ADD TOLERANCES (ZN C6-3, D2-3)	RF	09.09.30
D	MAG. PARTICLE AND CAD PLATE AS MFD.	CP	06.10.31
C	ADD CAD PLATING	CP	06.08.14
B	ADD D6018-125 & PRIME AND PAINT	CP	06.06.30
A	NEW ISSUE	CP	06.03.31
REV.	DESCRIPTION	BY	DATE
DESIGN			
DRAWN	RF		
CHECKED			
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	09.09.30		

**DART AEROSPACE LTD**  
HAWKESBURY, ONTARIO, CANADA

DRAWING NO. REV. E  
D350-748-241 SHEET 1 OF 4  
TITLE SCALE  
CROSSTUBE (AS 350/355 HI AFT) NTS

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THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL, AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.

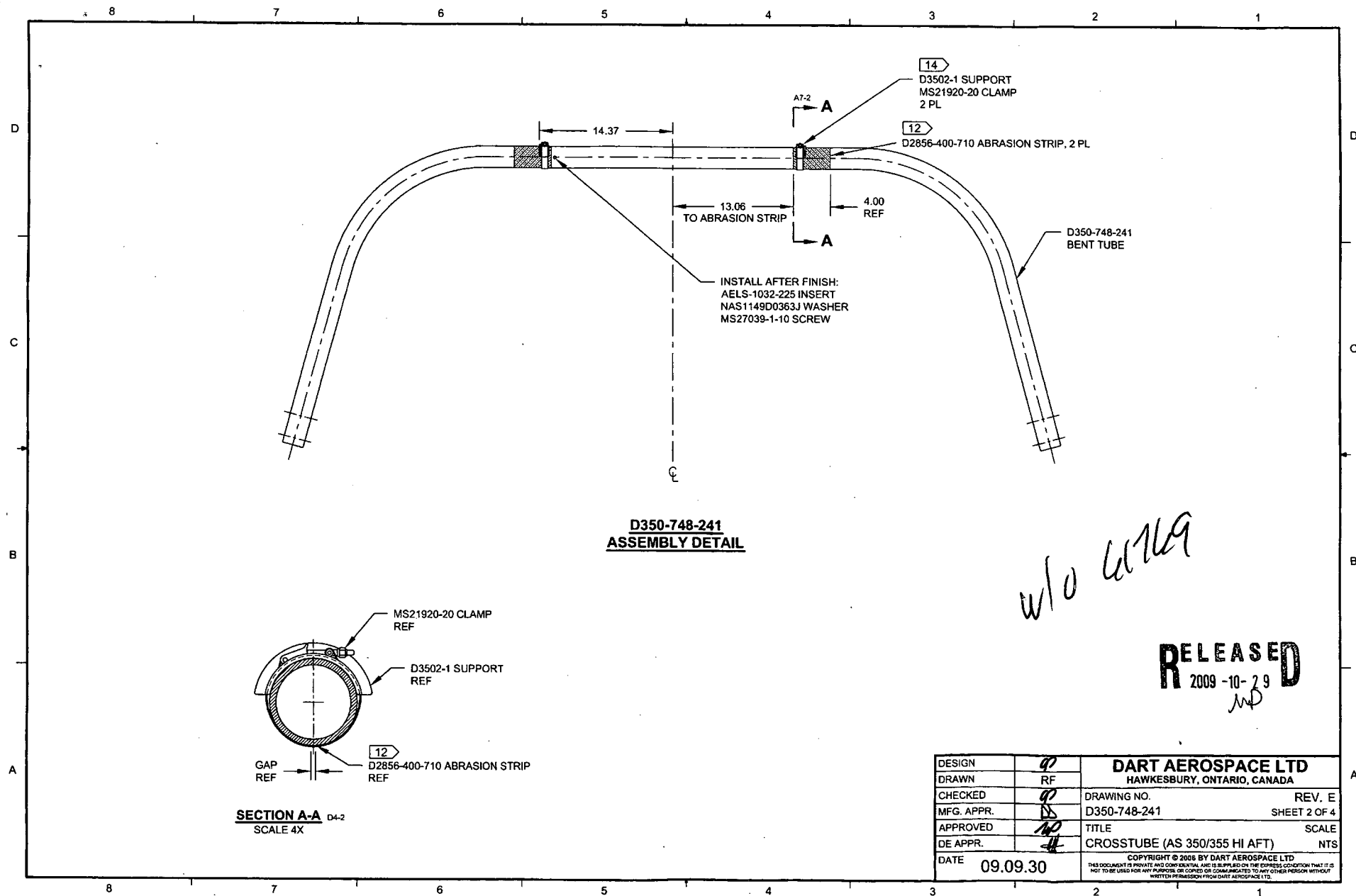
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries





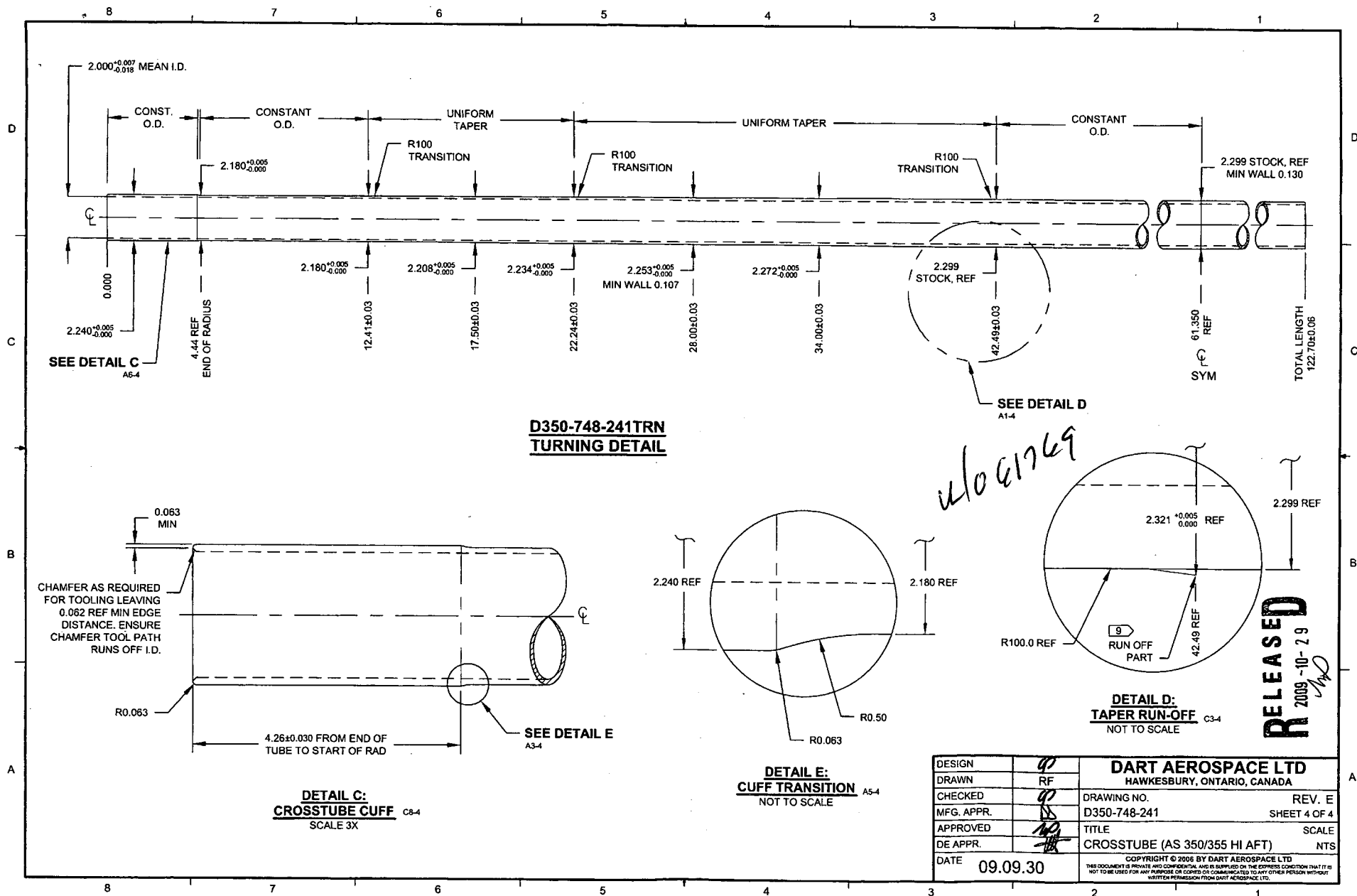
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



## LIQUID PENETRANT TEST REPORT

P- 15199

PAGE 1 OF 1

CLIENT DART AEROSPACE DATE DEC. 21-2010 TIME AM ☒ PM ☐  
ATTENTION LINDA LACELLE ACUREN JOB NO. 188-10-0971  
ADDRESS 1270 ABERDEEN ST. PO/WO NO. 13181  
HAWKESBURY ONT. WORK LOCATION HAWKESBURY PLANT  
ACCEPTANCE STD. ASTM 1417 REV./DATE 2005  
PROJECT SIX CROSS TUBES INSPECT + REINSPECT  
ITEM(S) EXAMINED AFTER DEFLECTION. PROCESS.

JOB DESCRIPTION PROCEDURE NO. LT-2 REV./DATE 2008 TECHNIQUE NO. LT-2 REV./DATE 2008  
PART NO. - MATERIAL STEEL THICKNESS VARIOUS  
SCOPE WET FLOUORESCENT LIQUID PENETRANT INSPECTION  
CARRIED OUT 100% EXTERNAL

## TEST DETAILS

METHOD ☒ FLUORESCENT ☐ VISIBLE ☒ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED  
FAMILY BRAND MAGNA FLUX BLACK LIGHT S/N 16459 ☐ OUTPUT > 1000  $\mu$ W/cm<sup>2</sup> ☐ AMBIENT < 2 fc  
PENETRANT ZL-67 MINIMUM DWELL TIME 45 MIN. LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT > 100 fc @ SURFACE  
PENETRANT REMOVER H<sub>2</sub>O MINIMUM DRY TIME >10 MIN. OTHER LABINO  
DEVELOPER SKD52 MINIMUM DWELL TIME 10 MIN. LIGHT METER S/N 1098866 CAL DUE DATE OCT-19-2011  
DEVELOPER TYPE ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY

## TEST SURFACE

SURFACE CONDITION ☐ AS GROUND ☐ AS WELDED ☒ MACHINED ☐ SHOT BLASTED ☒ CLEAN BARE METAL  
SURFACE TEMPERATURE ☐ < -4°C/ 20°F ☐ -4°C/ 20°F TO 10°C/50°F ☒ 10°C/50°F TO 52°C/125°F ☐ > 52°C/125°F

RESULTS- (☐ METRIC ☐ IMPERIAL)

PLATE

1 - CROSS TUBE-W.O. 61768	✓
1 - CROSS TUBE-W.O. 61767	✓
1 - CROSS TUBE-W.O. 61770	✓
1 - CROSS TUBE-W.O. 61769	✓
1 - CROSS TUBE-W.O. 63592	✓
1 - CROSS TUBE-W.O. 63591	✓
1 - CROSS TUBE-W.O. 61768	✓
1 - CROSS TUBE-W.O. 61767	✓
1 - CROSS TUBE-W.O. 61770	✓
1 - CROSS TUBE-W.O. 61769	✓
1 - CROSS TUBE-W.O. 63592	✓
1 - CROSS TUBE-W.O. 63591	✓

Cross tubes REINSPECTED AFTER DEFLECTION RESULTS AS FOLLOWS.

10.12.21

## Scope of Services

The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

## Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

## SIGNATURES

CLIENT REPRESENTATIVE Ran Titley DTR # E63236  
TECHNICIAN (SIGNATURE): [Signature] REPORT REVIEWED BY:  
NAME (PRINT): Mike Johnston NAME INITIALS  
1<sup>ST</sup> TECHNICIAN 2<sup>ND</sup> TECHNICIAN  
CGSB LEVEL 2 SNT LEVEL 2 CGSB LEVEL 2 SNT LEVEL 2  
CGSB REG. No 6606 CGSB REG. No 6606

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector
10.12.21	140.5	- DEFLECT TUBE TO <u>3000</u> lbs FOR 1 MINUTE. - RE-MEASURE HEIGHT & WIDTH.	CP	10.12.21		CP 10.12.21 DS/042	S 10/12/22
10.12.21	140.6	NDT Tube following deflection testing.				CP 10.12.21 DS/042	S 10/12/22

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

**CERTIFICATE OF  
CONFORMANCE**

**CADORATH PLATING CO. LTD.  
2150 LOGAN AVENUE  
WINNIPEG, MANITOBA R2J-0J1**

**DATE:** Jan-14-2011

**CONSIGNED TO:** Dart Aerospace Ltd.  
1270 Aberdeen St  
Hawksbury, ON K6A 1K7

**W/O #:** 101007

**INVOICE #:** 52908

**CONTRACT OR  
PURCHASE ORDER #**

**13189**

**DESCRIPTION:** SKID

**QTY** 1

**P/N #** D350-748-201

**S/N #** B61769

**STRESS RELIEF BAKE @375 DEG. BAKE HEAT CHART #11-5. MPI  
INSPECTED IAW ASTM-E-1444. CADMIUM PLATED IAW AMS-QQ-P-  
416C, TYPE 2 YELLOW, CLASS 1. BAKE HEAT CHART #11-24.**

8 11/01/24

**CERTIFICATE: I certify that the items indicated here on have  
been inspected and tested and conform to all specifications  
and requirements detailed on the contract or purchase order.**

**Approved Inspector:**





# LIQUID PENETRANT TEST REPORT

P- 05496 :

CLIENT DART AEROSPACE DATE JAN/26/2011 PAGE 1 OF 2  
ATTENTION LINDA LACETTE / CHANTAE / IAN ACUREN JOB NO. 188-11- TIME AM ☒ PM ☐  
ADDRESS 1270, ABERDEN ST. PO/WO NO. AS ADDRESS  
HAWKESBURY, ON WORK LOCATION AS ADDRESS  
ACCEPTANCE STD. ASTM1417/AST-038 REV./DATE 2005  
PROJECT WET FLUO PENETRANT INSPECTION ON 14" CROSS TUBES; 4 "collective BEZEL CRACK"  
ITEM(S) EXAMINED SEE BELOW

JOB DESCRIPTION PROCEDURE NO. LT-000 REV./DATE 2008 TECHNIQUE NO. LT-000 REV./DATE 2008  
PART NO. MATERIAL ALODIDE ALUMINUM THICKNESS N/A  
SCOPE PERFORMED A WET FLUORESCENT LIQUID PENETRANT INSPECTION ON 100% OF THE EXTERNAL SURFACE

TEST DETAILS  
METHOD ☒ FLUORESCENT ☐ VISIBLE ☐ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED  
FAMILY BRAND MAGDA FLUX BLACK LIGHT S/N 13798 OUTPUT > 1000  $\mu$ W/cm<sup>2</sup> ☒ AMBIENT < 2 fc  
PENETRANT 26-67 MINIMUM DWELL TIME 10 MIN. LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT > 100 fc @ SURFACE  
PENETRANT REMOVER H<sub>2</sub>O MINIMUM DRY TIME > 10 MIN. OTHER  
DEVELOPER SKD-52 MINIMUM DWELL TIME 10 MIN. LIGHT METER S/N CAL DUE DATE FEB/05/2011  
DEVELOPER TYPE ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY

TEST SURFACE  
SURFACE CONDITION ☐ AS GROUND ☐ AS WELDED ☐ MACHINED ☐ SHOT BLASTED ☒ CLEAN BARE METAL  
SURFACE TEMPERATURE ☐ < -4°C/ 20°F ☐ -4°C/ 20°F TO 10°C/50°F ☒ 10°C/50°F TO 52°C/125°F ☐ > 52°C/125°F

RESULTS- (☐ METRIC ☒ IMPERIAL)

NO.	COMMENTS	ACCEPT	REJECT
1	4 X "collective BEZEL CRACK"	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	CROSS-TUBE W.O. ID 63591	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	CROSS-TUBE W.O. ID 63592	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	CROSS-TUBE W.O. ID 63746	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	CROSS-TUBE W.O. ID 63747	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6	CROSS-TUBE W.O. ID 63748	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	CROSS-TUBE W.O. ID 63749	<input checked="" type="checkbox"/>	<input type="checkbox"/>

SEE Page 2 of 2

NOID 64913 → ITEM ID: - D350-748-101 (H.F.)  
ITEM ID: - D350-748-101 (H.F.)  
ITEM ID: - D350-748-101 (H.F.)  
ITEM ID: - D350-748-201 (H.A.)  
ITEM ID: - D350-748-201 (H.A.)  
ITEM ID: - D350-748-201 (H.A.)  
ITEM ID: - D350-748-201 (H.A.)

Scope of Services  
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care  
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES  
CLIENT REPRESENTATIVE Ian Titley DTR # E63121  
TECHNICIAN (SIGNATURE): [Signature] SIGNATURE  
NAME (PRINT): YVES DESROSIERS REPORT REVIEWED BY:  
CGSB LEVEL 2 1<sup>ST</sup> TECHNICIAN NAME INITIALS  
CGSB REG. NO. 3049 CGSB LEVEL 2 2<sup>ND</sup> TECHNICIAN  
CGSB REG. NO. ---





RAPPORT#

## RAPPORT D'INSPECTION NON DESTRUCTIVE

(SUITE)

REPORT# P-05496

PAGE 2 DE 2

CLIENT DART AEROSPACE  
ATTENTION LINDA LAKELLE / CHAUNCEY LIAWDATE JAN/26/2011  
ACUREN W/O : 188-11-02103HEURE ☒ AM ☐ PMRÉSULTATS ☐ MÉTRIQUE ☒ IMPÉRIALE

ITEM	Comments	ACCEPT	REJECT	ITEM ID
8	CROSS TUBE W.O. ID 61763	✓		ITEM ID: D350-748-101(H.F.)
9	CROSS TUBE W.O. ID 61764	✓		D350-748-101(H.F.)
10	CROSS TUBE W.O. ID 61765	✓		D350-748-101(H.F.)
11	CROSS TUBE W.O. ID 61766	✓		D350-748-101(H.F.)
12	CROSS TUBE W.O. ID 61767	✓		D350-748-201(H.A.)
13	CROSS TUBE W.O. ID 61768	✓		D350-748-201(H.A.)
14	CROSS TUBE W.O. ID 61769	✓		D350-748-201(H.A.)
15	CROSS TUBE W.O. ID 61770	✓		D350-748-201(H.A.)

— NO REJECTABLE INDICATION WAS DETECTED, AS PER APPLICABLE STANDARDS

## Étendue des services

L'entente selon laquelle le Groupe Acuren Inc. Exécute les services ne concerne que les énoncés par écrit. En aucune circonstance ces services ne s'étendent au-delà de l'exécution des services demandés. Il est entendu que toutes les descriptions, les observations et les expressions d'opinions faites par Acuren reflètent les opinions ou les observations de l'entreprise fondées sur l'information et les hypothèses fournies par le propriétaire/opérateur, et elles ne constituent pas des déclarations ou des garanties ou ne peuvent être interprétées comme constituant. Le groupe Acuren Inc. N'assume aucune des responsabilités du propriétaire/opérateur, et le propriétaire/opérateur conserve la responsabilité entière des décisions prises en matière d'ingénierie, de fabrication, de réparation et d'usage à partir de l'information ou des données fournies par Acuren en rapport avec les services décrits dans les présentes ne peuvent excéder le coût des services rendus.

## Norme de Diligence

Dans l'exécution des services, le Groupe Acuren inc. Applique le degré de diligence, le soin et la compétence normalement exercés dans des circonstances semblables par d'autres fournisseurs de ce type de services opérant dans la même localité ou dans une localité similaire. Aucune autre garantie, implicite ou explicite, n'est faite ou voulue par le Groupe Acuren Inc.

## SIGNATURES

REPRÉSENTANT CLIENT

TECHNICIEN (SIGNATURE):

NOM (MOULIÉ):

Bar T. Hey  
MOULÉJ. VESDESBIERS  
1<sup>er</sup> TECHNICIENONGC NIVEAU 2 SNT NIVEAU 2ONGC N° REGISTRATION 3249[Signature]  
SIGNATURE[Signature]  
2<sup>me</sup> TECHNICIENONGC NIVEAU — SNT NIVEAU —ONGC N° REGISTRATION —FTJ#: E63121

RAPPORT

RÉVISÉ PAR:

NOM

INITIALES